

## WHAT IS CLAIMED IS:

1. A time-of-flight mass spectrometer reflector, comprising:  
a single piece reflector body with a radially symmetrical trough.

2. A reflector in accordance with claim 1, wherein said reflector body is made of a  
5 stainless steel with an inner side of said trough being polished.

3. A reflector in accordance with claim 1, wherein said reflector body is formed of a  
carrier material with a conductive coating with an inner side of said trough being polished.

4. A reflector in accordance with claim 1, wherein a diameter of said reflector body  
measured at the edge of said trough, is between 60 mm and 75 mm.

10 5. A time-of-flight mass spectrometer, comprising:  
a housing, into which molecules of a gas to be analyzed enter;  
an ion source, by which the molecules present in the housing are ionized;  
an annular electrode to which a certain voltage potential is applied, and by which the  
ionized molecules are accelerated;  
15 a reflector, by which the ionized and accelerated molecules are deflected, said reflector  
being a one piece reflector body with a radially symmetrical trough; and  
a detector, which is hit by the ionized and deflected molecules at the end of the path  
traveled.

6. A time-of-flight mass spectrometer in accordance with claim 5, wherein the ion source comprises a resonance enhanced multi photon ionization (REMPI) source.

7. A time-of-flight mass spectrometer in accordance with claim 5, wherein said detector comprises a multi-channel plate.

5           8. A time-of-flight mass spectrometer in accordance with claim 5, wherein said detector is formed of one of stainless steel or a suitable carrier with a conductive coating and an inner side of said trough is polished.

9. A time-of-flight mass spectrometer in accordance with claim 5, wherein a diameter of said reflector, measured at an edge of said trough, is between 60 mm and 75 mm.

10           10. A time-of-flight mass spectrometer, comprising:

a housing with a gas inlet into which molecules of a gas to be analyzed enter said housing;

an ion source directed at the path of the gas to be analyzed for ionizing the molecules present in the housing;

15           an annular electrode to which a certain voltage potential is applied, said annular electrode accelerating ionized molecules along a path;

a reflector deflecting ionized and accelerated molecules, said reflector being a one piece reflector body with a radially symmetrical trough; and

a detector at an end of the path, said detector being hit by the ionized and deflected molecules for detecting the arrival of ions.

11. A time-of-flight mass spectrometer in accordance with claim 10, wherein the ion source comprises a resonance enhanced multi photon ionization (REMPI) source.

5           12. A time-of-flight mass spectrometer in accordance with claim 10, wherein said detector comprises a multi-channel plate.

13. A time-of-flight mass spectrometer in accordance with claim 10, wherein said detector is formed of one of stainless steel or a suitable carrier with a conductive coating and an inner side of said trough is polished.

10           14. A time-of-flight mass spectrometer in accordance with claim 10, wherein a diameter of said reflector, measured at an edge of said trough, is between 60 mm and 75 mm.